

## Solar Energy Technology Program

# Furthering Energy Independence



### A Portfolio of Solar Technologies

**S**olar technologies use the sun to provide heat, light, hot water, electricity and even cooling for homes, businesses and industry. Through public-private partnerships, the U.S. Department of Energy's Solar Energy Technologies Program sponsors research and development that improves the performance and reduces the cost of solar power. To achieve this goal, the Program supports the research activities of world-class scientists and engineers in industry, academia and the national laboratories.

### Program Basics

The Program has two primary research efforts:

- **Photovoltaics (PV)** develops semiconductor materials to convert sunlight directly into electricity, through an instantaneous, quiet process that uses no moving parts
- **Concentrating Solar Power (CSP)** develops reliable, cost-competitive systems that drive steam turbines

and engines using heat from concentrated sunlight

In his 2006 State of the Union address, President Bush launched the Solar America Initiative, marking a new drive to make PV cost-competitive with other forms of retail energy by 2015.

### Multiple Markets, Multiple Solutions

With continued R&D, solar technologies can provide our nation with low-cost energy from abundant sunlight, and help reduce the country's greenhouse gas emissions. Through a combination of photovoltaic and thermal technologies, it will be practical to provide all the energy needed by an energy efficient home. It will also be cost-effective in some regions to generate power at a utility-scale through concentrating solar power systems

Improvements in performance and cost will continue to open new markets for solar technologies. Photovoltaics are already making significant inroads in high-value niche markets, such as remote,

stand-alone power for telecommunications and other "off-grid" applications.

International market growth is also strong for photovoltaics, fueled by incentives by such countries as Germany. Domestic growth is increasing as a result of the Energy Policy Act of 2005 tax incentives for residential and commercial use as well as State incentives. As manufacturing costs fall, photovoltaics are increasingly used for homes and other businesses already connected to the grid.

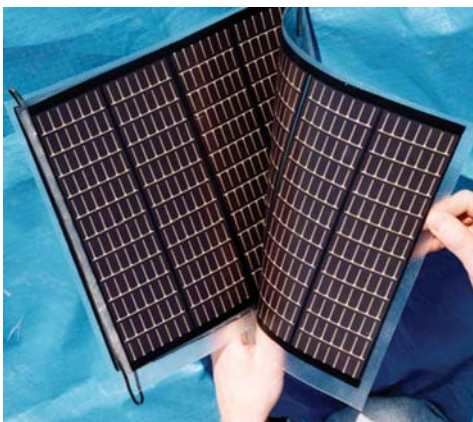
While it is true that some solar technologies have been commercialized, we still have a long way to go to reach market competitiveness for photovoltaic (PV) technologies in the U.S. without incentives. Due in large part to the research funded by the Department of Energy the cost of electricity from PV has dropped from more than \$2.00 per kilowatt-hour in 1976 to \$0.18-\$0.23 per kilowatt hour today. Yet, to compete with conventional power sources, PV costs still need to fall by another two-thirds. Under the President's Solar America Initiative,

the Solar Program will focus on PV technology pathways that have the best chance of successful commercialization by 2015. Funding will be applied to three core efforts: fundamental research, advanced materials and devices and technology development. The Solar America Initiative will promote the formation of "Technology Pathway Partnerships" to achieve the commercialization goal of \$0.05-\$0.10 per kilowatt hour by 2015.

The second category of research in the Solar Program is concentrating solar power. A key attribute of CSP systems is thermal storage which allows these systems to generate electricity on demand, not just when the sun is shining. CSP technologies are best suited for utility-level power generation. DOE-sponsored improvements over the past 15 years have reduced the cost of this technology from \$0.36 per kilowatt hour to between \$0.12

and \$0.14 per kilowatt hour. With DOE's continued support, industry hopes to achieve costs in the \$0.035-\$0.062 per kilowatt hour range by 2020, which will allow for more CSP plants to be built.

In all of its forms, solar energy will provide a renewable energy option for the United States—an option that will last as long as the sun continues to shine.



## Reliable, Affordable Energy

The mission of the Solar Energy Technologies Program is to mobilize the nation's resources to develop reliable and affordable solar technologies that further energy independence and economic prosperity while improving environmental quality.



## A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.



U.S. Department of Energy

## Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

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